

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-10, 19, and 21 are active in the present application. Claims 1, 2, 5, 8, 9, 19, and 21 are amended by the present amendment. Claims 11-18 and 20 are indicated as withdrawn in response to a previous restriction requirement.

Claims 1, 2, 5, 19, and 21 are amended to clarify the subject matters of the present invention; and Claims 8 and 9 are amended to correct minor inconsistencies. Thus, it is believed no new matter is added.

In the outstanding Office Action, Claims 1-7, 10, and 19 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,838,121 to Fairbairn et al. (hereinafter “Fairbairn”); and Claims 8, 9 and 21 were rejected under 35 U.S.C. § 103(a) as unpatentable over Fairbairn in view of U.S. Patent No. US 6,086,679 to Lee et al. (hereinafter “Lee”).

Applicant respectfully traverses the rejection of Claims 1-7, 10, and 19 under 35 U.S.C. § 102(b) as anticipated by Fairbairn.

MPEP § 2131 states that, to anticipate a claim, the reference must teach every element of the claim.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). “The identical invention must be shown in as complete detail as is contained in the claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

The present invention relates to a multichamber-type processing apparatus having an arrangement in which a transfer chamber is coupled to a plurality of processing chambers for etching or ashing a substrate to be processed. In particular, independent Claim 1 is directed to a

processing apparatus that includes, in part, a monatomic nitrogen atom supply unit for providing dissociated monatomic nitrogen atoms in the processing chambers. The monatomic nitrogen atoms are provided in one of the processing chambers after finishing processing the substrate therein to remove charge on an electrostatic chuck provided in said one processing chamber.

Independent Claims 2 and 19 include similar features.

Since the monatomic nitrogen atoms remove the charge on the electrostatic chuck without incurring damage to the substrate, a processing apparatus according to the independent claims may advantageously ensure excellent accuracy and throughput.

In contrast, Fairbairn describes an apparatus for concurrent processing of multiple wafers in the fabrication of integrated circuits.¹ In particular, Fairbairn Figs. 23 and 24, which were cited in the Office Action, show a remote clean module 800 for removing deposited material from the interior surface of the chamber after a sequence of process runs.² The remote clean module 800 of Fairbairn includes a source of a precursor gas 804, a remote activation chamber 806, and a power source 808. The precursor gas from the source 804 is delivered into the remote activation chamber 806. The power source 808 generates microwaves which are guided into the remote activation chamber 806. The microwaves activate the precursor gas to form a reactive species in the remote activation chamber 806 and then the reactive species is flowed into a processing chamber.³

However, Fairbairn fails to teach or suggest each feature of the claimed invention. First, Fairbairn fails to teach or suggest a processing apparatus that removes charge on an electrostatic chuck. Fairbairn describes a remote clean module that is used to remove deposited material from an inner surface of the chamber, but Fairbairn is silent regarding the removal of charge on an electrostatic chuck. Accordingly, Applicant respectfully submits that Fairbairn fails to teach or suggest a processing apparatus that includes a monatomic nitrogen atom supply unit in which

¹ Fairbairn at Abstract.

² Fairbairn at column 18, lines 8-15.

³ Fairbairn at column 18, lines 16-37.

atoms are provided “to remove charge on an electrostatic chuck provided in said one processing chamber,” as recited in independent Claims 1 and 2, and as similarly recited in independent Claim 19.

Further, Applicant respectfully submits that Fairbairn fails to teach or suggest that dissociated monatomic nitrogen atoms are provided in a processing chamber. According to Fairbairn, if NF₃ is selected as the precursor gas, a nitrogen radical (N*) is produced in the remote activation chamber 806.⁴ However, Fairbairn indicates that the nitrogen radical is short lived, and therefore will not survive a long transfer from the remote activation chamber 806 to the processing chamber.⁵ Accordingly, it is clear that the nitrogen radical cannot arrive at the processing chamber of Fairbairn.

Thus, Fairbairn also fails to teach or suggest a processing apparatus having a monatomic nitrogen atom supply unit that provides “dissociated monatomic nitrogen atoms in the processing chamber,” as recited in independent Claims 1, 2, and 19.

Accordingly, Applicant respectfully submits that independent Claims 1, 2, and 19, and claims depending therefrom, patentably define over Fairbairn.

In addition, Applicant traverses the rejection of Claims 8, 9, and 21 under 35 U.S.C. § 103(a) as unpatentable over Fairbairn in view of Lee.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.⁶

⁴ Fairbairn at column 20, lines 11-13.

⁵ Fairbairn at column 20, lines 13-17.

⁶ MPEP § 2143.

Moreover, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure.⁷ Further, MPEP § 2143.03 states that all claim limitations must be taught or suggested by the prior art.⁸ "All words in a claim must be considered in judging the patentability of that claim against the prior art."⁹ If an independent claim is non-obvious under 35 U.S.C. § 103, then any claim depending therefrom is non obvious.¹⁰

Claim 8 is directed to a processing apparatus having an ultraviolet irradiation unit used as an energy supply unit for converting the N₂ gas into the dissociated monatomic nitrogen atoms. Further, Claim 9 requires an induction coil wound around a dielectric portion of a pipe and a high frequency power supply that is used as the energy supply unit. In Claim 21, a processing apparatus includes means for providing dissociated monatomic N atoms in the processing chamber.

In contrast, Lee describes a transport polymerization system for preparing polymer thin film.¹¹ Lee Fig. 4 shows a transport polymerization system 400 using electromagnetic radiation to crack precursor molecules,¹² and Lee Fig. 6 shows a transport polymerization system employing RF.¹³ However, in the transport polymerization systems described in Lee, an organic compound (not nitrogen) is dissociated, and the non-nitrogen organic compound is then deposited onto a surface of a wafer. Accordingly, Lee does not teach or suggest an energy supply unit for supplying dissociated monatomic nitrogen atoms to remove charge on an electrostatic chuck. Further, since Lee describes only deposition systems (e.g., a transport polymerization system or a chemical vapor deposition (CVD) system), Lee does not provide any motivation for combining the features of Lee with the remote clean module of Fairbairn.

⁷ In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

⁸ In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

⁹ In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

¹⁰ In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

¹¹ Lee at Abstract.

¹² Lee at column 20, lines 52-54.

¹³ Lee at column 24, lines 65-66.

Since none of the references in the Office Action teach or suggest the above mentioned features of Claims 8, 9, and 21, and since the references themselves fail to provide motivation to include those features or to combine with features in other references, it is respectfully submitted that Fairbairn and Lee, whether taken individually or in combination, fail to teach or suggest the features of Claims 8, 9 and 21.

Accordingly, Applicant respectfully requests that the rejection of Claims 8, 9, and 21 under 35 U.S.C. § 103(a) be withdrawn.

Thus, Applicant respectfully submits that independent Claims 1, 2, and 19, and claims depending therefrom, are allowable.

Should the Examiner require or consider it advisable that the specification, claims an/or drawings be further amended or corrected in formal respects, in order to place the case in condition for final allowance, then it is respectfully requested that the Examiner recommend that such an amendment or correction be carried out by Examiner's Amendment so that the case may be passed to issue.

Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing this case to allowance, the Examiner is invited to telephone the undersigned.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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